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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/539,313

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BRIARCLIFF MANOR, NY 10510

EXAMINER

MATHEWS, ALAN A

ART UNIT

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2851

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,313	Applicant(s) NEIJZEN ET AL.	
	Examiner ALAN A. MATHEWS	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-15 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 10, lines 16 and 17, "layer 3" should apparently be "layer 5" to be consistent with previous recitations of "layer 5". On page 14, line 1, "spot 111" should apparently be "spot 11" to be consistent with previous and subsequent recitations of "spot 11".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7, 9-13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by the International Publication W0 99/49504 (cited in the office action along with an English translation). The International Publication W0 99/49504 discloses in figure 1 and page 12, lines 14-24, and pages 13 and 14 of the translation, directing and focusing a radiation beam to a spot on a layer on wafer W by at least one optical element 4. XY stage 10 causes relative movement of the layer on wafer relative to the optical element 4. Page 13, lines 14-22, discloses the step

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and repeat method of exposure, so that, successively, different portions of the layer on W are irradiated. Figures 1 and 2 further disclose maintaining the interspace between optical element 4 and the wafer W with a liquid 7. The liquid 7 is supplied by a conduit 21. The space between optical element 4 and W is considered to be a recess. With respect to claims 2 and 10, page 23, lines 21-24, discloses forming a dividing wall that encloses the wafer. This dividing wall could be considered to be a rim. With respect to claims 5 and 13, figure 1 and page 19, lines 18-20 of the translation, discloses a working distance "d" is set at about 2mm as an example. With respect to claims 7 and 15, an outflowing opening 21a is considered to be a canal which is open towards the layer on W. The canal distributes the liquid longitudinally along the canal and dispenses distributed liquid toward the layer on W. Page 23, line 24, further discloses providing a pipe for recovering liquid within this dividing wall. This pipe would be a passage that is recited in claims 3, 4, 11, and 12.

3. Claims 1, 2, 7, 9, 10, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese patent document 6-124873 (cited in this office action along with an English translation). The Japanese patent document 6-124873 discloses in figure 1 and paragraphs # 0014, # 0015, and # 0016 of the English translation, optical element 7 which directs and focuses a radiation beam onto a spot on a layer of wafer 2 by at least optical element 7. XY stage 13 causes a relative movement of the layer on the wafer 2 relative to optical element 7 so that different portions of the layer are irradiated. Figure 11 and paragraph # 0019 disclose feeding liquid 30 by means of pump 22 and filter 23 and a supply conduit. The end of the supply conduit is considered to be a canal (or outflow opening) distributing liquid 30 longitudinally along the

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canal and dispensing distributed liquid 30 towards the layer. Liquid 30 fills up a recess between the optical element 7 and wafer 2. With respect to claims 2 and 10, the container 9 includes a rim.

4. Claims 1, 5, 7, 9, 13 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Saten et al. (U. S. Patent Application Publication No. 2002/0020821 A1). Saten et al. '821 discloses in figures 2, 3, and 4, and paragraphs # 0032 - # 0036, directing and focusing a radiation beam to a spot 11 on layer 5 by means of optical element 59. Elements 35 and 39 cause relative movement of the layer 5 relative to optical element 59. Opening 69 is considered to be a canal dispensing liquid toward the layer 5. Paragraph # 0042 further discloses alternative shapes of outflow openings 69' in a different embodiment. Gap 53 is the interspace. The gap 53 can also be considered a recess. With respect to claims 5 and 13, paragraph # 0016 and # 0017 discloses a gap of 4 μm to 100 μm , which is within the range claimed.

5. Claims 1-7 and 9-15 are rejected under 35 U.S.C. 102(b) as being anticipated by the German patent document DD 221 563 A1 (cited in this office action along with an English translation). The German patent document DD 221 563 A1 discloses in figures 1 and 3 an optical element 2 directing and focusing a radiation beam to a spot on a layer 26 on substrate 25. The substrate table 16 moves relative to the optical element 2. The interspace between optical element 2 and the layer 26 on substrate 25 is filled with a liquid. The recess could be the portion within auxiliary device 7 as seen in figure 3. With respect to claim 2, the recess has a rim portion which would be part of the wall portions of auxiliary device 7. With respect to claims 3

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and 11, element 3 could be considered a wall and element 10 is the passage in the wall. With respect to claim 5 and 13, page 9 discloses the distance between 3 and the photoresist is **5 μ m to 5mm** which includes portions of the range claimed. With respect to claim 6 and 14, in a different interpretation, page 9, lines 9 and 25, and page 24, line 3, disclose that the auxiliary device could have a plane-**concave** lens. With respect to claims 7 and 15, element 10 could be considered to be a canal.

Allowable Subject Matter

6. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest wherein said interspace between said layer and said surface of said at least one optical element nearest to said layer has a thickness H, the layer and the at least one optical element are moved relative to each other at a velocity V, the liquid is supplied via an outflow opening having a width W measured in a plane parallel to said layer and at a flow rate equal to $0.5 \cdot \beta \cdot H \cdot (W + \alpha \cdot H) \cdot V$, where α is a constant between 1 and 10 and β is a constant between 1 and 3 in combination with all the other steps recited in the parent claim to dependent claim 8.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takahashi, Lee et al., and Takanashi et al. are cited to show other immersion lithography apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN A. MATHEWS whose telephone number is (571)272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan A. Mathews/

Primary Examiner, Art Unit 2851

/Alan A. Mathews/
Primary Examiner
Art Unit 2851

AM